AUG 8 1957

AUGUST 1957

FIREMEN

SIXTY-SECOND YEAR • NATIONAL FIRE PROTECTION ASSOCIATION

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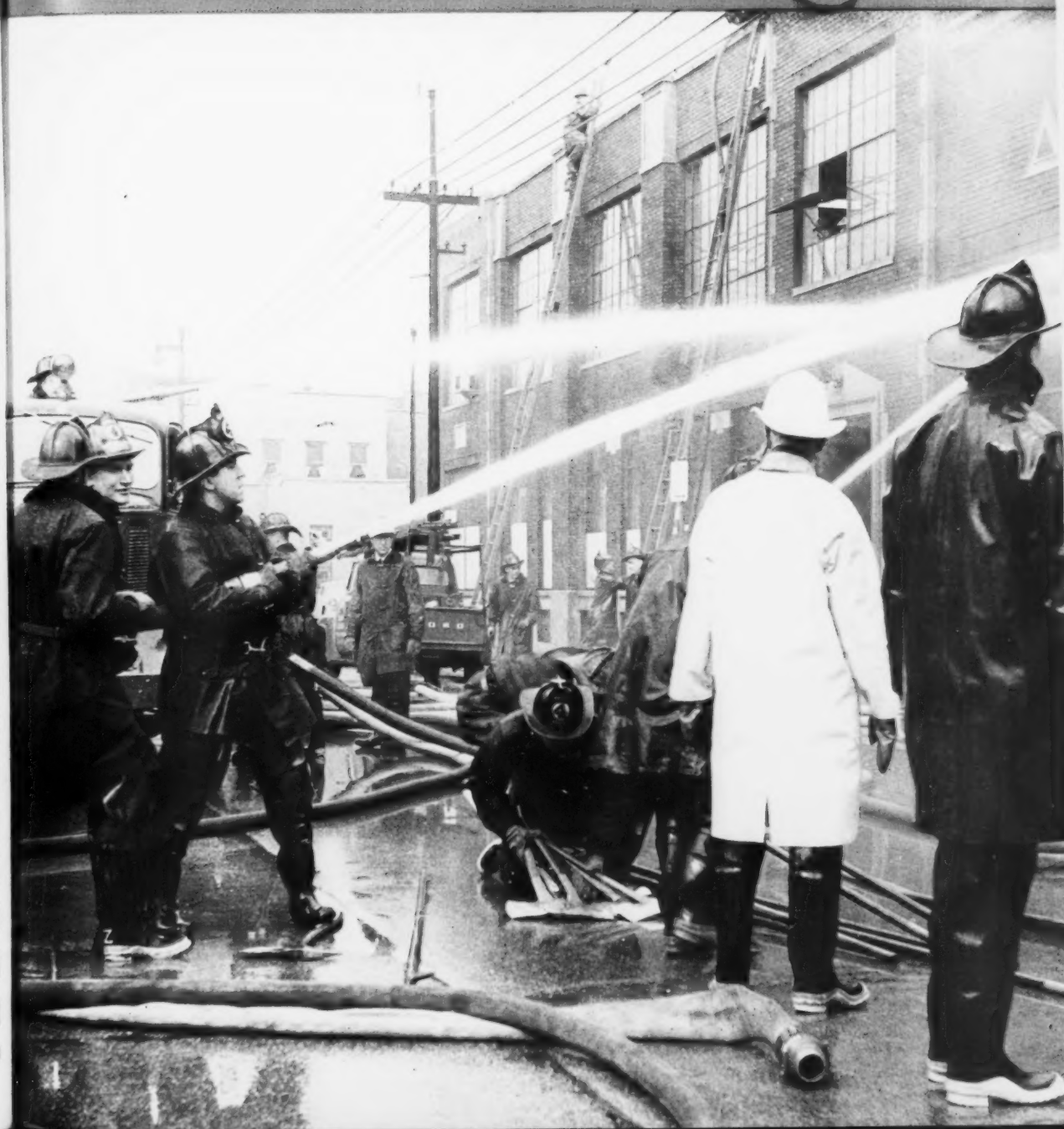


Milwaukee's MACK Aerials w

have greater maneuverability • ability to reach confined areas • shorter quarters • excellent all-around performance and dependability

A full, 100-foot aerial ladder mounted on a truck less than 32 feet long overall...that's the Mack-Magirus.

The Milwaukee Fire Department reports that the shorter trucks enable them to maneuver more rapidly through narrow streets, work their way quickly into difficult alleys, courts and driveways . . . and have ladders up in a jiffy!

Possessing all the strength and capabilities of conventional aerials that require up to 75% longer trucks, the Mack-Magirus units also permit faster turn-around and much more efficient utilization of curb space when several aerials are needed to ladder a building. And—very important—they require much less floor space in fire stations.

Costs? No more than conventional, more cumbersome units. The Milwaukee Fire Department, headed by Chief Edward A. Wischer, has an additional unit on order right now.

All other Macks in the Milwaukee lineup have standout records, too

In addition to their 100-foot Mack-Magirus aerials, the Milwaukee Fire Department operates 10 Mack pumpers, a tanker-pumper combination, and a Mack 85-foot aerial ladder six-wheel trailer-truck. Although some of these units go back over 20 years, the department has never had to overhaul a Mack engine. None of their Macks has ever been out of service for any length of time due to mechanical failure. Department figures show that *the total cost of new parts for nine Mack pumpers during a six-year period was about $100.00.*

Why not find out for yourself about the famous Mack dependability? Call your local Mack representative soon. Mack Fire Apparatus, Plainfield, N. J. In Canada: Mack Trucks of Canada, Ltd.

DOUBLE AS 70-FOOT WATER TOWERS

The Mack-Magirus ladders are exceptionally strong and adaptable. Milwaukee uses them for rescue work, for working lines, for roof work—and as water towers. The Department has actually tested them at 70 feet with 1½-inch nozzles at 220 psi and reports that they are impossible to tip over at this height, more than twice that recommended for ladder pipes on other aerials.

COMPLETE LINE OF PUMPERS

s with Magirus Ladders

NO STATION HOUSE REMODELING HERE

Each Mack-Magirus aerial delivered to Milwaukee has saved the city an estimated $40,000 remodeling charge, which would have been necessary if conventional models had been assigned to the station houses. Floor length for the Mack-Magirus is under 60 feet as compared to the 90 or 100 feet needed for 6-wheel aerial ladder trucks.

DIAGONAL PARKING WITH SHORTER UNITS

The shorter wheelbase of the Mack-Magirus aerial ladder truck permits diagonal parking without blocking the street to other equipment. *Three* Mack-Magirus units can actually be used in the space needed by a single 4- or 6-wheel conventional truck, important when more than one aerial unit is needed to ladder a building front.

FAST ACTION IN CLOSE QUARTERS

So maneuverable is the short Mack chassis . . . and so fast-acting is the Magirus ladder . . . that Milwaukee doesn't equip the units with the usual 50-foot ground ladders. They rely instead on the Mack-Magirus's ability to raise its steel ladder speedily in confined areas—as at this 3-alarm, rooming-house fire where three elderly persons were snatched from death.

MACK
first name for
FIRE APPARATUS

5237

500 TO 1250 GPM · SQUAD AND HOSE WAGONS · AERIALS 65' TO 100' · COMBINATION LADDER TRUCKS

A "SURE-FIRE CURE"

that pays off in 3 situations—

1 **CALL REPORT**—GRASS AND BRUSH FIRE
Snuffed out by driving around perimeter of fire with man on rear step operating 3XD from pumper tank. Fighting fire "on the move" saves time—conserves water.

2 **CALL REPORT**—FARM BUILDINGS
Saved barn with water drawn from stream the pumper couldn't reach. Used 3XD as booster to pumper.

3 **CALL REPORT**—RESIDENCE
Fire confined to one wing. Left 3XD to pump out basement and a good thing—had another call on arrival at station.

IF YOU GET a lot of calls like these, you'll find the 3XD Auxiliary Pump one of the most useful, valuable pieces of equipment money can buy.

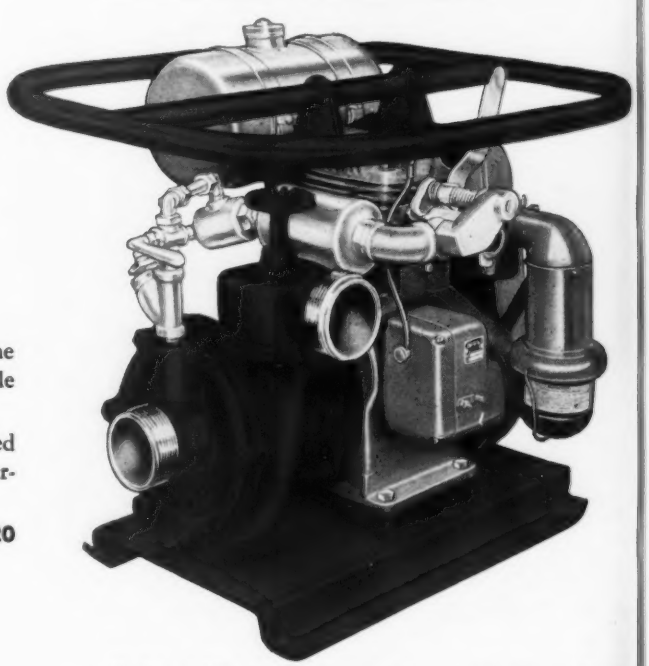
FOR 3 COMMON types of fires, the 3XD will "speed the cure" by adding extra mobility, capacity and versatility to your operation — and at low cost.

FOR DETAILS, WRITE FOR 3XD BULLETIN 8120

★ AMERICAN ★
FIRE PUMP COMPANY

BATTLE CREEK, MICHIGAN, U. S. A.

AMERICAN FIRE PUMP
Model 3XD



Used as mobile pump, booster, or to pump out basements. Supplies two 1½" hose lines with ½" nozzles, or one 2½" line with ¾" nozzle. Handles dirty water without serious damage.

Just how much better is EUREKA Multiple-Woven than ordinary Fire Hose?

EUREKA's exclusive *multiple-weaving* process, employing filler cords of "Dacron"*, produces top-quality fire hose with these outstanding advantages:

- 50% stronger—withstands 600 pounds pressure,
- Weighs one-third less,
- More flexible—handles easier,
- Takes 33% less space,
- Permits more hose to be carried,
- Dries more quickly,
- Provides maximum safe service life,
- Affords no space between jacket plies to collect dirt and water,
- Smooth-interior ply assures highest nozzle pressure.

Long-time users of Eureka Multiple-Woven hose know that the secret of true economy lies in buying the *finest* . . . not the cheapest!

* Du Pont's polyester fiber

"For greater protection to life and property"

EUREKA FIRE HOSE

Since 1875, Specialists in Manufacturing Circular-Woven Rubber-Lined Fire Hose

1 Market Street • Passaic, New Jersey

Division of United States Rubber

Here's the

1957 NFPA Fire Prevention Week Poster

For a complete list and illustrations of Fire Prevention Week materials see pages 31 and 32 of this issue.

Firemen

Volume 24 Number 8

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FP Week Contest Entry Forms

Entry forms for the four divisions of this year's Fire Prevention Contest are now available. Copies will be sent to all persons and organizations having previously requested them. If your organization has not returned an order card for these forms as furnished to all former entrants earlier this Spring, send your request to Contest, NFPA Executive Offices, for either Municipal, Industrial, Government, or Military forms as soon as possible.

This year's Municipal entry form has been completely revised to emphasize year-round fire prevention. The NFPA Public Relations Department will furnish a sample copy on request.

Cover Picture

Members of the Chicago, Illinois, Fire Department are shown in fireground action on this month's cover. While detailed information on this fire is not available at this writing, the photo deserves attention because of its clarity and exceptional detail of fire fighting activity. It is rare that photographers have opportunity to snap a photo of such action without losing some of the detail because of smoke or inability to "freeze" the movement of the hard-working men. However, Photographer E. E. Deeter of Chicago had the ability and luck to take the picture and submitted it to the NFPA Fire Record Department.

Regional Meeting

The NFPA Regional Meeting is scheduled to be held in Richmond, Virginia, November 18–20, with the John Marshall Hotel serving as headquarters. Chief Fire Marshal Sutton Mullen, Jr., of Virginia and Walter O. Randlett of the Virginia Electric & Power Company are serving as Chairman and Vice-Chairman of the Sponsoring Committee.

A program of particular interest to NFPA members in the Richmond area is now being prepared and will be published in a forthcoming issue of NFPA *Fire News*. There will be a number of items of importance to fire department personnel, featuring some of the top technical authorities who are familiar with fire protection and fire control problems.

Social activities will include a trip to Jamestown and Williamsburg, since this year is the 350th anniversary of the founding of Jamestown. NFPA members who plan to attend the meeting should write directly to the hotel for reservations.

"Sparks" and "Buffs" Beware!

We note in a recent issue of "*Fire*, the Journal of the British Fire Services," that a man acting for a firm of fire assessors was fined 60 pounds and costs for "using a wireless telegraphy apparatus with the intent to obtain information as to the contents of messages which he was not authorized by the Postmaster General to receive." One set was tuned in to the London Fire Brigade.

This, it appears to the Editors of NFPA FIREMEN, points to a very great untapped source of revenue for American municipalities. At the rate of penalty assessed by our British brethren for listening in to fire department "wireless" messages, our communities are overlooking a revenue of at least $25,000,000 a year if all fire "fans," "buffs," "sparks," and fire insurance men and off-duty fire fighters could be clipped for unauthorized listening in on the fire dispatcher's party line. Of course, there might be some loss in customers if the rates were too high because it would give some wives another argument in the long domestic battle "Do you have to have that thing running all the time"? We know one wife who observed, "The only place in the house you don't hear the fire alarm is in the bathroom." We understand this deficiency has since been corrected.

CHEMICAL RETARDANT FOR FOREST FIRES

Forest Service report describes results of field trials using sodium calcium borate on forest fires.

FOR the past two years the Division of Forest Fire Research, Forest Service, U. S. Department of Agriculture, has been experimenting with sodium calcium borate for slowing the progress of forest, brush, and grass fires. Recently the Forest Service issued Technical Paper No. 15, prepared by the California Forest and Range Experiment Station, describing results of field trials with this chemical solution by Foresters Harry R. Miller and Carl C. Wilson of the Division of Forest Fire Research. The findings should be of interest to many fire service members, particularly those who live in areas where forest, grass and brush fires are a perennial problem.

The report is encouraging. The chemical was given a series of critical tests including application on actual fires from the ground and from the air, and Technical Report No. 15 lists the following conclusions:

1. The edge of a fire (forest, grass or brush) can be knocked down faster and with greater confidence because there will be fewer reignitions if the chemicals are used instead of plain water.

2. Pretreated fire lines can be used successfully on the flanks, rear, and cooler parts of the head of fire.

3. The danger of spot fires can be reduced by fireproofing hazardous fuels inside the fire line.

4. Roads, ridge top clearings, and other fire breaks can be widened quickly and safely.

5. Pretreated back fire lines can be prepared rapidly on controlled burns and wild fires.

Another statement in the report is that tactical air support for large-scale brush, grass, and forest fires is now a reality, principally because of the effectiveness of this chemical application. The sodium calcium borate proved useful for the following:

1. Lightning fires, spot fires, and slop-overs on large fires can be knocked down and held by air attack.

2. Chemical-retardant lines can be built ahead of fires in areas inaccessible to men or where it is unsafe for men to work.

3. Fire breaks can be strengthened from the air safely.

4. Safety islands can be established around isolated equipment and buildings.

5. Areas accessible to spot fires can be "fire proofed."

Cooperating in the two-year period of tests were the California State Division of Forestry, the Los Angeles County Fire Department, Region Five of the U. S. Forest Service, and the United States Borax and Chemical Corporation which produces the chemical. A fleet of seven conventional ground tankers were spotted throughout California for tests in a wide variety of fuels and burning conditions. In addition, a fleet of crop duster airplanes which had been converted for bulk water drops was also used to determine the advantages and limitations in aerial application.

Difficulties and Limitations

At first, mixing the water-borate slurry proved to be a difficult problem. Laboratory tests had indicated that abrasiveness and friction loss in hose lines at low flow would be major problems in using pumps designed for moving water. In the field trials with ground tankers, the greatest problem was to keep the pump packing tight enough to hold adequate pressure and still not burn the pump shaft. Because of such experience the California Division of Forestry is not going to use the borate solution in conventional fire trucks except in emergency conditions until satisfactory pumping equipment is developed.

Each of the seven standard pumper tanks was modified for the field tests, and an opening was made in the top of the tank so that the dried chemical could be poured easily into the water, then the solution was agitated. After considerable experimentation, it was found that a mixture of four pounds of sodium calcium borate per gallon of water provided the best solution. (This mixture with water weighs about 10.1 pounds per gallon.) The California Division of Forestry developed a special drum with hand-powered paddles for mixing the solution, and experimentation is still going on to develop the best equipment for this purpose. The Western Fire Equipment Company of San Francisco developed a "fire retardant injector" which has an adjustable proportioning and mixing valve with regulating valves on all inlets. Above this is mounted a hopper of 200 pounds capacity which feeds chemicals into the mixing mechanism. The assembly is designed particularly to pass through the doorway of a "TBM" Naval aircraft. The device will mix the slurry at a rate of 100 to 200 pounds pressure with a mixture discharge of 25 to 34 gallons per minute.

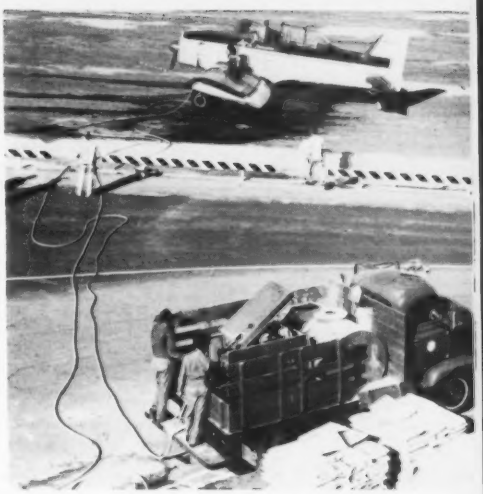
An interesting aspect was the establishment of a cost figure for the chemical. Technical Report No. 15 states that if the borate is mixed at the rate of four pounds per gallon, the retardant alone will average about 18 cents per gallon. It also states that the cost of getting plain water on a forest fire in California ranges from 50 cents to $6.00 per gallon, and the additional cost for the fire retardant is relatively insignificant.

Results of Field Trials

DURING the 1956 season the ground tankers applied 6,900 gallons of borate to about 22,000 feet of fire edge on 26 fires. The foresters were able to get good comparison of the effectiveness of the retardant and plain water under similar situations.

Here are some results of the field trials:

Sodium calcium borate proved much more effective for direct attack on fires involving heavy fuels. In one such test in the Shasta Trinity National Forest, fire fighters found that it took only about one-third as much borate slurry as water to hold down and extinguish a given fire.



(Left) Aerial tankers and the borate solution both were used in a San Bernardino Mountain forest fire which burned 15,000 acres in November, 1956. Here a volunteer worker pours dry sodium calcium borate into a hopper from which the solution is mixed with water in a tank truck, then pumped to a 100 gallon tank in an airplane.

(Right) This Transland AG-2 "crop duster" was used successfully in fire attack. Water-borate "payload" averaging about 161 gallons (1,663 pounds approximately) was carried in four wing tanks. Los Angeles County Fire Department Chemical Unit truck in foreground had a 400 gallon tank of water, a 6-cylinder Chrysler engine, a 500 gpm pump and other equipment for pumping and mixing slurry.

(Photos by Transland Company)

When used in attack on fires involving grass and brush, the borate solution was found to knock down the fire as quickly as water and showed to advantage over water by eliminating most rekindles because of the residual coat of dry chemical left in the fuel. In effect, the report states, fires in grass and light brush can be knocked down faster with this type of chemical attack.

In a special test one field unit sprayed 7,064 feet of line, 3 to 5 feet wide, in grass along a State road right-of-way. Seventeen days later, the crew started a hazard reduction fire and reported that the fire crept through this sprayed line in only a few places where the fuel was not covered sufficiently.

Coverage needed for maximum protection is estimated to be about 1.8 gallons per hundred square feet. It is not necessary to saturate the grass or brush fuels, but rather to cover all fuel surfaces with the slurry.

Air Tankers

The use of aerial tankers for fire attack turned out to be a full-scale fire fighting operation. Almost ten times as much retardant was dropped by planes on 14 fires as was applied by ground tankers on 23 fires. The borate solution drops of 100 gallon loads assured control on 11 of the 14 fires, were of no help on 2, and had an adverse effect on 1 fire because the solution knocked down a back fire and resulted in a lost fire line. However, the prolonged effects of chemical retardants really demonstrated their value in this aerial tanker operation. On the Inaja fire in Cleveland National Forest, the chemical retardant was dropped at several locations. The drops were not only effective in delaying the fire, but once six drops in a "saddle" resulted in a white island of borate solution when the chemical line was flanked by the fire.

It was found also that the aerial tankers can knock down and hold small fires and spot fires. For such direct attack drops it is desirable that about one-half of the load falls on the fire, and the other half on unburned fuels just outside the fire. The holding of "slop-overs" of big fires was done successfully with air tankers until hand crews could get into position to handle the fire successfully.

There are limitations to aerial attack in that the air tankers cannot successfully knock down hot rolling fires in brush or timber. This was tried on several fires and it was decided that the aerial drops were wasted on fast moving fronts.

Things To Be Solved

While the report on the use of this fire retardant is encouraging, nevertheless, there are still some problems to be solved. For one thing, the chemicals may be injurious to plant life and may sterilize the soil, which may or may not be more important than the possibility of fire spread. Equipment is needed to simplify and speed up the mixing of chemicals for ground and air tankers. The injector type of mixer seems to be the most promising equipment for this purpose. Because of the abrasion on conventional pumps, special pumps and nozzles must be developed to pump and apply the slurry type mixture. There also remains some experimentation to be done on how much sodium calcium borate is required to exert significant retardant effects in fires in different fuel types and density.

(The United States Borax and Chemical Corporation which supplied the chemicals [trade name "Firebrake"] to the Forest Service for the tests, has prepared a technical data sheet which may be obtained by writing to the Pacific Coast Borax Company Division, 630 Shatto Place, Los Angeles 5, California — Ed.)

(Right) Typical aerial attack on fire front. Majority of drops were made at 80 to 99 mph, altitudes varying from 6 to 20 ft. Resultant swaths were about 40 ft. wide, up to ½ mile in length.

Volunteers Build Fire Training School

FOR a number of years fire fighters in Monroe County, Pennsylvania, felt the need of an established site for firemen's training, particularly because Monroe County has seventeen fire companies with a total of 737 active members. These fire companies all belong to the Monroe County Association headed by President Harvey Burris, Vice President Harold Albert and Secretary Jay Snover.

For over two years this group planned and worked for the establishment of adequate training facilities. Major financial assistance came from the Stroudsburg, Pennsylvania, Lions Club which donated $600 for materials for a drill tower. The East Stroudsburg Fire Department then donated land for the training site.

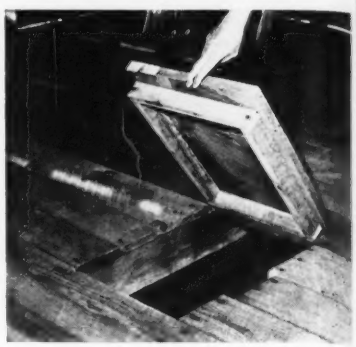
Since readers of FIREMEN magazine frequently ask for information about the construction of a simple drill tower, the list of materials for Monroe County tower should be of interest. The four-story wood-framed structure features a 10 by 10 smoke room on the first floor and has trap doors and scuttles throughout for ventilation training. Four fifty-foot telephone poles at the corners are the structure's main supports. Other materials used were:

- 8 tie rods of ¾-in. steel, threaded each end, 14 ft. long
- 320 8-in. cinder blocks
- 110 8-in. cement blocks
- 4 yds. cement for footing around poles
- 13 pieces of 2 by 8 in. lumber 12 ft. long
- 48 pieces of 2 by 6 in. lumber 12 ft. long
- 110 pieces of 2 by 4 in. lumber 8 ft. long
- 40 pieces of 2 by 4 in. lumber 12 ft. long
- 4 window frames and windows for second floor
- 2 rolls of building paper to retain smoke between smoke chamber second floor
- 300 sq. ft. of 1-in. board lumber
- 1 door, 2 hinges, 1 lock
- 6 bags cement
- 3 bags lime
- 2 yds. sand
- 1 U-bolt and two rings of 1-in. material for rope work on top of building
- 1 roll of tar paper for roof

In addition the Monroe County Fire School features classroom and laboratory instruction conducted in cooperation with the East Stroudsburg School District. Two miles outside of Stroudsburg is another training site used for structural and flammable liquids fire fighting training and demonstrations.

Cost of building such a training center would vary in different localities. In this instance all labor was provided by Monroe County fire fighters who completed assigned tasks of carpentry, cement work and other labor during spare time. Additional funds came from the Staples Construction Company which donated the telephone poles and $200 for other construction work. Training is conducted in cooperation with the Pennsylvania Public Service Institute. (*Information and photos furnished by Oliver H. Wilson, East Stroudsburg.*)

Instructor Jim Somers demonstrates point during class on ventilation.



Trap doors on each floor can be removed during ventilation problems.

Election in Montana

BEN GANNON of the Big Butte Volunteer Fire Department recently was elected President of the Montana Volunteer Firemen's Association. Re-elected during the conference were John R. Miehle, East Helena, Vice President at Large, and James B. Keyes, Butte, Secretary-Treasurer.

(Left) Drill tower before completion. Smoke house at bottom is used for gas mask and ventilation. Even a relatively inexpensive tower like this can add variety to training of volunteer fire fighters.

(Right) Monroe County fire fighters tackle flammable liquids blaze with fog lines.

COOPERATION IN PLANT FIRE PROTECTION

A BASIC ingredient for assuring good fire protection of an industrial plant is cooperation between the local municipal fire department and the industrial plant safety personnel. Establishment of a sound pre-planning program will also help to pave the way for smooth functioning during fire emergencies.

Such planning is evident in the program developed by the plant protection staff of Kaiser Aluminum's Extrusion Works in Halethorpe, Maryland, and fire fighters of the Baltimore County Fire Department. Covering some 800,000 square feet just off U. S. Route 1 outside of Baltimore, this plant operates 24 hours a day, seven days a week. Numerous fire safety and other plant protection regulations are in effect continuously throughout the plant area.

An around-the-clock program of fire protection and safety maintenance is conducted by Plant Protection Chief Joseph S. King and Plant Safety Supervisor James M. Doherty. The modern, fully-integrated aluminum extrusion plant does have special safety factors which must be considered. "Fully-integrated" means that pig aluminum and certain alloying constituents are melted in large gas-fired furnaces and cast from the molten state into extrusion ingots as the first stage of the process. Aluminum's melting point is in the neighborhood of 1,400 degrees Fahrenheit. Consequently the remelting furnace area in the plant must be carefully supervised and strictly regulated to minimize fire and explosion dangers. In addition, regulatory measures must also be applied to age ovens, homogenizing furnaces, induction heaters, die ovens, and other furnace operations, all of which generate high temperature conditions and must be carefully controlled. A vast amount of hydraulically operated equipment is employed in the extrusion process, and care must be exercised to combat oil slicks and leakage which could be danger points.

(Right) Plant Protection Chief Joseph S. King (right) greets Baltimore County Fire Department's Lieutenant Leroy Fink and crew to begin tour of aluminum extrusion plant.

Chief King (left) and visiting fire fighters visit "degreasing" pit. Note large fog nozzles at top which operate at fixed temperature.

Recently Chief King instituted a cooperative protection program with the assistance of Battalion Chief Austin Dietz of the Baltimore County Fire Department. A special plant orientation tour was arranged by King for members of the County Fire Department, and nearly 100 County fire officials have already visited the plant.

The orientation starts with a pre-tour briefing in which the firemen are instructed in the sequence of plant operations. As each department of the plant is reviewed, the fire potential in each area is pointed out so that the visitors can develop a fire fighting plan which might be developed for possible emergencies.

For example, the fire fighters viewed the charging of the remelt furnaces, noted the method of entering the pig and alloy into the molten bath, and determined what approach would be used to combat a fire in this area. The use of water fog was heavily recommended for this type of emergency, as were CO_2 extinguishers.

As another example, the firemen studied the huge 1,500,000-pound aluminum stretcher unit and simulated an hydraulic oil fire in the pit below. Hydrant locations, hose racks, and access lanes were carefully plotted to expedite action if such a blaze occurred.

Since the plant has exceptionally high ceiling areas, a tentative battle plan was drawn up to combat roof fires. Pressures in the company's fire mains were noted, and plans were made for the spotting of deluge nozzles and other heavy stream equipment and for supplying the sprinkler and standpipe connections on plant property.

The project of developing mutual cooperation between Kaiser Aluminum and the municipal fire fighting forces has proven successful and, at last reports, will be continued. The instructional courses are also being provided for the company's volunteer fire brigade, as well as the regular Plant Protection Corps.

Industrial plant personnel who are responsible for developing similar programs can get useful information from the NFPA's "Industrial Fire Brigades Training Manual," 160 pages, $3.25 per copy.

MAKING A GOOD JOB OF IT

By Warren Y. Kimball

More About Nozzle Flows

EVERY so often it pays to take another look at important subjects such as the flow of water through various sizes of nozzle tips. Knowledge of this subject is essential for evaluating hose streams for fire fighting because the nozzle "meters" the flow of water. This is true with both solid stream and fog nozzles. However, as pressures and flows from fog nozzles are more difficult to measure, we will first consider solid streams. This information may then lead to better understanding of flows from fog or spray nozzles.

Water flowing from various sizes of nozzle tips behaves in accordance with certain natural laws. In the case of flows from nozzles, each time we increase the square root of nozzle pressure by one we add another equal amount of water discharged. Let us observe this in the case of the 1-in. tip, which flows 30 gpm (almost) when the square root of nozzle pressure is 1. Each time we increase nozzle pressure, so that the square root of nozzle pressure accordingly rises by one digit, we have another 30 gpm flowing. With a square root of 10 (100 lbs. nozzle pressure) we have 300 gpm flowing. This is shown below:

Nozzle Pressure in Pounds	Sq. Root Nozzle Pressure	GPM
1	1	30
4	2	60
9	3	90
16	4	120
25	5	150
36	6	180
49	7	210
64	8	240
81	9	270
100	10	300

The above table is given in round numbers for convenience. Actual flows would be very slightly less than these amounts.

For all practical purposes we may say that with a 1-in. tip the gpm flow equals 30 times the square root of nozzle pressure. To be more exact, we would use the figure 29.83 instead of 30 and also make a slight adjustment for the coefficient of discharge for various sizes of tips. Sometimes the figure of 29.7 is used. Nevertheless, from the fact that for the 1-in. tip, flow equals 30 times the square root of nozzle pressure, we will have little difficulty in determining the flow from other sizes of nozzle tips. All that needs to be done is to multiply the formula for the 1-in. tip by the square of the diameter for each of the other tips.

For example, we wish to know the flow from a 2-in. tip. Two times two equals four. Thus 30 times the square root of nozzle pressure times 4 gives us the gpm flow from the 2-in. tip. At 100 lbs. nozzle pressure, we would have $30 \times 10 \times 4$ or 1200 gpm. Thus the 2-in. tip flows four times as much water as the 1-in. tip.

Below are listed the squares of the diameter of various sizes of nozzle tips.

Tip Size (Inches)	Square of Diameter
¾	0.5625
⅞	0.7700
1	1.0
1⅛	1.2656
1¼	1.5625
1⅜	1.8906
1½	2.25
1⅝	2.6406
1¾	3.0625
2	4.0
2¼	5.0625
3	9.0

For practical use it is not always convenient in the field to multiply 30 times the square root of nozzle pressure times the square of the diameter, so let us simplify the problem by doing the multiplication in advance. This will give us the unit of flow for each size of tip when multiplied by the square root of nozzle pressure, and for practical field purposes other than testing of pumps the results can be rounded to the nearest as shown below:

Tip	$29.83 \times D^2$	Round No.
¾	16.779	17
⅞	22.969	23
1	29.83	30
1⅛	37.753	38
1¼	46.609	47
1⅜	56.386	56
1½	67.117	67
1⅝	78.769	79
1¾	91.354	90
2	119.32	120
2¼	151.01	150
3	268.47	270

In Table I we recapitulate all of this information in one table for ready reference. In Table II we show the flows from the various tips at the various square roots of nozzle pressures. Two facts should be understood in using these tables. First, the figures assume a nozzle coefficient of C = 100, a figure seldom reached in practice. C is more likely to be between .99 and .997. In other words, the actual flows may be as much as one percent less than the figures shown. You may lose as much as one gallon per 100 with the smaller tips and something less than that with larger tips.

The other fact is that at very low pressures you may not be able to get sufficiently accurate Pitot readings to make the figures significant and you may not always have a true full flow. However, this is of no practical importance when using the formula in connection with hose streams because we are not concerned with flows below 25 lbs.

From these figures showing flows based upon the square of nozzle diameters we also have a useful means of comparing flows from different sizes of nozzle tips. For example, we may observe that the flow from the 1¾-in. tip is three times that of the 1-in. tip at the same pressure. As previously mentioned, the 2-in. tip has four times the flow of the 1-in. tip. The flow from the 1¼-in. tip is approximately 1½ times that of the 1-in. tip and two ⅞-in. tips equal one 1¼-in. tip. In order that the relative capabilities of the various tips may be kept in mind, Table I shows the area of each tip orifice in square inches. Obviously, the larger the opening the more water will be discharged at a given pressure.

TABLE I. FLOWS FROM OPEN NOZZLES (C=100)

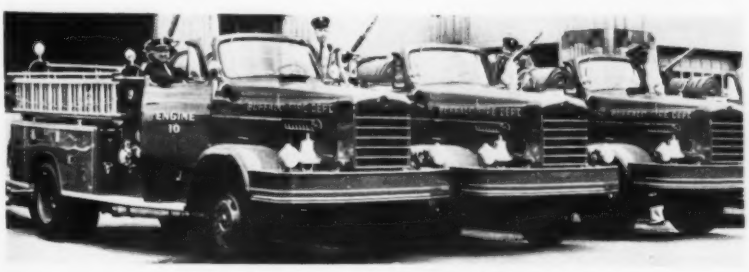
Nozzle Tip Size in Inches	3/4	7/8	1	1 1/8	1 1/4	1 3/8	1 1/2	1 5/8	1 3/4	2	2 1/4	3
Area (Sq. Inches)	.44179	.60132	.7854	.9940	1.2272	1.4843	1.7671	2.0739	2.4053	3.1416	3.9761	7.0686
Diameter	0.75	0.8775	1.0	1.125	1.25	1.375	1.5	1.625	1.75	2.0	2.25	3.0
D^2	0.5625	0.7700	1.0	1.2656	1.5625	1.8906	2.25	2.6406	3.0625	4.0	5.0625	9.0
29.83 x D^2	16.779	22.969	29.83	37.753	46.609	56.386	67.117	78.769	91.354	119.32	151.01	268.47
GPM at 1 lb.	16.8	23.0	29.8	37.7	46.6	56.4	67.1	78.8	91.3	119	151	268
GPM at 100 lbs.	168	230	298	377	466	564	671	788	913	1193	1510	2685
Round No.	17	23	30	38	47	56	67	79	90	120	150	270

Thus we conclude that there is no great mystery about the flow of water from nozzles. If we change the weight or viscosity of the liquid, as in the case of sea water, we will need to make a slight adjustment in the coefficient used in our formula.

With spray nozzles we cannot measure the pressure from the orifice so we use a piezometer or ring gage at the base of the nozzle. Pressures presumably will be higher at this point before the water has passed through a nozzle designed to break up the stream. In fact, in some spray nozzles a considerable part of the pressure at the base of the nozzle may be used to make spray. Nevertheless, if a spray nozzle discharges say 300 gpm at 100 lbs. (square root of nozzle pressure is 10), it would discharge 210 gpm at 49 lbs. (square root of nozzle pressure is 7) other things being equal. Of course, if we adjust the stream pattern in certain types of nozzles, we change the orifice opening and our calculations would have to be based upon the flow at that particular opening.

TABLE II. FLOWS FROM NOZZLE TIPS (C=100)

Nozzle Pressure psi	$\sqrt{NP}$	3/4	7/8	1	1 1/8	1 1/4	1 3/8	1 1/2	1 5/8	1 3/4	2	2 1/4	3
1	1	17	23	30	38	47	56	67	79	91	119	151	268
4	2	34	46	60	75	93	113	134	158	183	239	302	537
9	3	50	69	90	113	140	169	201	236	274	358	453	805
16	4	67	92	120	151	186	226	268	315	365	477	604	1074
25	5	84	115	150	189	233	282	335	394	457	595	755	1342
36	6	101	138	180	226	280	338	403	473	548	715	906	1611
49	7	118	161	210	264	326	395	470	551	639	835	1057	1879
64	8	134	184	240	302	373	451	537	630	731	954	1208	2148
81	9	151	207	270	340	419	508	604	709	822	1074	1359	2416
100	10	164	230	300	377	466	563	671	788	913	1193	1510	2685
121	11	185	253	330	415	513	620	738	866	1005	1312	1661	2893
144	12	202	276	360	453	559	677	805	945	1096	1432	1712	3162



New Pumpers for Buffalo

The Buffalo Fire Department recently accepted these 1,000 gpm pumpers manufactured by Four Wheel Drive Auto Company, Clintonville, Wisconsin. The pumpers feature 260-horsepower engines, 250-gallon booster tanks, 9 equipment compartments (7 of them lighted), and power-proportioned four-wheel drive.

"Boy, Frederickson thinks he's really grabbed something this time!"

Old Salem Museum

Recently the Fire House Museum in the restored Moravian Village of Old Salem (founded 1766) in Winston-Salem, North Carolina was dedicated. Ceremonies included a demonstration of 18th Century fire fighting equipment including the 4-man pump shown above, which was used in the community in 1785. Also shown was a smaller 2-man unit (left) designed for use inside buildings, leather buckets and other equipment. For contrast, the Winston-Salem Fire Department showed a modern Mack triple combination 1,000 gpm pumper. (*Old Salem photo — Conway.*)

Sparky in Iowa

WILLIAM R. SIMPSON, Field Instructor, Firemanship Training, Iowa State College, reports some successful fire prevention activities featuring the Sparky doll used as a trophy for fire departments throughout the State of Iowa. The Iowa State Fire School, which awards the doll to some fire fighter upon completion of the training program, has established basic rules by which a fire department may earn possession of the doll for one year. The following rules apply:

1. Sparky must go to an Iowa Fire Department.
2. He must be returned to the Iowa State Fire School by the department a year later, when a report will be given of how he was used in fire prevention activities during the year.
3. No department may have possession of the doll more than 1 year in 6.

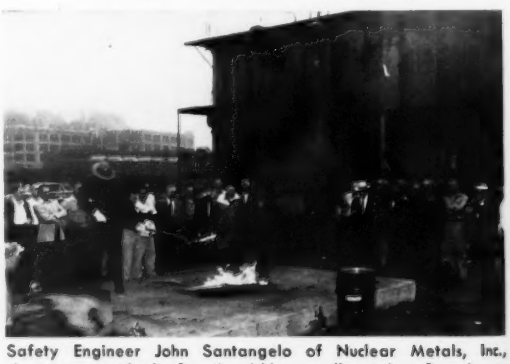
Under these rules the Sparky doll has already been a delegate to the winter meeting of the Iowa Fire Chief's Association and the 1957 Fire Department Instructors' Conference in Memphis, Tennessee; has appeared on radio and television and at last reports had taken part in activities before 25,000 people.

Course on Radiation Hazards

UNDER the direction of NFPA member Francis L. Branigan, Safety Engineer, U. S. Atomic Energy Commission, the Boston, Massachusetts, Fire Department, headed by Chief Leo C. Driscoll, in June conducted a two-day instructors' course on radiation hazards in fire fighting. It was attended by members of 19 fire department which surround Boston and by representatives from other New England States. The three-day program was co-sponsored by the industrial firm, Nuclear Metals ,Inc., of Cambridge.

Field demonstrations in the extinguishment of fires involving radio active materials were held at the Boston Fire School, and radiological monitoring instruments were used while the fires were in progress. The course was designed particularly to give the men attending the necessary information so that they in turn could return to their own fire departments and furnish instructions in basic operating procedures in the presence of radio active materials. (See FIREMEN for February, 1957.)

The Boston Fire Department keeps an up-to-date list of all firms within the city limits which use, store, or handle radioactive materials. A standard operating procedure has been developed for cooperation with these firms during fires or other emergencies.



Safety Engineer John Santangelo of Nuclear Metals, Inc., shows one method of extinguishing small uranium fire. Long-handled shovel is used to immerse uranium in nearby metal drum filled with water. Watching are Boston's Fire Commissioner Francis X. Cotter (white hat), Chief Driscoll, Assistant Chief William A. Terrenzi, behind drum at right center.

ROCHESTER STAYS OUT FRONT

THE Fire Bureau of Rochester, New York, headed by Commissioner Kenneth C. Townson and Fire Chief Walter Adams is continuing its improvement program which has already made it the best housed and best equipped fire force in the United States. We have previously reported (see FIREMEN for November, 1954) the story about the million dollar Rochester Fire Academy and Maintenance Plant.

In the past several years, great strides have been made in the program of replacing all of the old inadequate fire houses with modern buildings, many of which are at new locations. The location of the new stations was the result of careful studies made by the Fire Bureau in cooperation with engineers of the National Board of Fire Underwriters. This program has resulted in a reduction in the number of fire companies making possible a much stronger manning of the individual companies.

The Department has been continuing its outstanding apparatus replacement program under the direction of Deputy Chief of Apparatus Louis G. Vogt (member of the NFPA Committee on Fire Department Equipment). At the present time, the maintenance shops are building two 750 gpm pumpers of advanced design. These pumpers include many features designed by Chief Vogt, who is nationally noted for his contribution to the art of building efficient fire department equipment.

The Department is also purchasing additional aerial ladders. There are now 11 Pirsch aluminum hydraulic aerial ladders in service, and three spare aerial ladders There are also some 15 spare pumpers stored in the various stations ready to roll at a moment's notice. The oldest of the spare pumpers is less than a dozen years of age. Commissioner Townson, a former General in the National Guard, insists that second line apparatus must be as good and reliable as first line equipment.

We show pictures of just two of the many new buildings of the Rochester Fire Bureau. At lower left is the new auditorium building at the site of the renowned Rochester Fire Academy. This is built at the left of the original academy and shop building in the photograph. The auditorium has 600 removable seats, a well-equipped stage, new classroom facilities, a large restaurant type kitchen, offices for the personnel of the Training Division, and numerous training aids such as hydrants and cut-away pumps. Also added to the Fire Academy is an additional lounge above the original shop building. This has been provided adjacent to existing shop facilities so that informal meetings may be held by fire department organizations and officials. The connecting wing between the two main structures contains a number of facilities including a very attractive ladies' lounge.

The new fire station illustrated at upper right is unique on a number of counts. One is that it includes (at the right of the building) a separate wing providing headquarters for two fire battalions. This contains offices, sleeping quarters, and recreational facilities for these chief officers and their aides. There is also a separate garage for the chiefs' cars so that they can leave quarters without opening the doors to the main apparatus room.

The station houses two engine companies and Ladder Company No. 1 with a 100-ft. aerial. In addition, it houses a spare pumper and 100-ft. aerial fully equipped and ready to roll if needed. Each fire company in the station has a separate bunk room which makes it possible for the watchman to alert the companies which are to roll without turning out all of the companies in the station.

In addition to the very spacious apparatus room in the center structure, the station includes a very beautiful recreation room at the left and a special reading room. It has a modern kitchen with complete facilities including an automatic dishwasher, also an automatic washer for the fire fighters' work clothes and cedar closets for storing dress uniforms. Another feature is that all equipment such as gasoline pumps and water coolers has been recessed into the walls so that they will not be in the way of the men or apparatus. Ample parking space is provided for the private cars of the fire fighters.

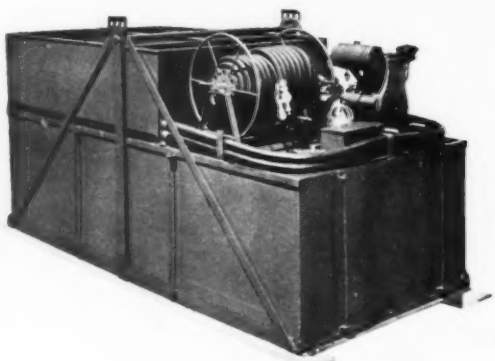
SLIP-ON TANKS

FROM time to time members of rural volunteer fire departments inquire about the availability of slip-on tanks for fire-fighting vehicles. These units have some favorable features including light weight, compact design and general adaptability to several types of vehicles. For a number of years they have been used extensively in forest fire fighting and by rural fire departments which use small, maneuverable vehicles for grass and brush fires. (See NFPA No. 295M — "Community Equipment and Organization for Fighting Forest, Grass and Brush Fires.")

Two advantages of slip-on tanks are that they can be removed from vehicles when they are not needed for fire fighting and that the pumping unit can be removed and placed at a water source for continuous operation.

Two slip-on units are shown on this page. These particular tanks feature removable tops fastened by $\frac{5}{16}$-in. cap screws and 200 ft. of booster hose with a 1-in. fog nozzle is also included. The portable pump is demountable by use of a 1-in. hose spanner wrench. These units are manufactured by Western Fire Equipment Company, 69 Main Street, San Francisco, California.

(Right) This is a 150-gal. slip-on tank with attached pump and booster hose. Recommended for vehicles of 1-ton size, this outfit measures 47¾ inches in width, 50½ inches in length, and 44 inches in height (with reel attached).



(Left) Slip-on tank of 1,000-gal. capacity has special lifting frame to facilitate mounting. Tanks are provided with baffle plates. Pump capacity varies with the different tank models but in general are designed to meet U. S. Forest Service and State Forestry Department specifications.

California Arson Seminar

TWO hundred and seventeen arson investigators, fire marshals, fire department officers, police and other personnel from six states attended the Fourth Annual Arson and Fire Investigation Seminar held at the University of California in Los Angeles, June 10 to 14.

Welcoming the group and in charge of the program were Dr. Sam Houston, Assistant Head, Engineering Extension-Conference, University of California, and Samuel L. Fick, Chief, Bureau of Industrial Education, California State Department of Education.

Two of the five days were devoted to small classroom group discussion periods. On another day an actual fire was set to establish proper "procedure at a fire scene."

Serving as instructors during the five-day session were members of the Los Angeles County Sheriff's Office Arson Detail; Burbank Fire Department; Portland, Oregon, Fire Department; United States Forest Service; Los Angeles Fire Department; State of California Bureau of Criminal Identification and Investigation; Reno, Nevada, Fire Department; Paso Robles Police Department; Pomona Police Department; San Francisco Fire Department; National Board of Fire Underwriters; San Diego Fire Department; Valley Hospital, Van Nuys; and the Los Angeles County District Attorney's office.

The Fifth Annual Arson and Fire Investigation Seminar is scheduled to be held at the University of California in Berkeley, June 16–20, 1958.

New Fire Marshal

HUGH H. EARLE has been appointed to the position of Insurance Commissioner and State Fire Marshal for Oregon. He succeeds former Fire Marshal Robert B. Taylor, whose commission expired June 30, 1957.

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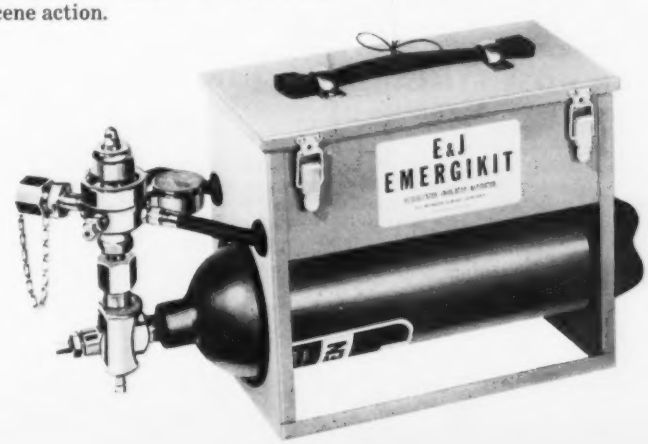

small light portable

WHAT SHOULD A FIRE CHIEF KNOW?

GERRY DALY'S column in a recent issue of *The Chief*, a newspaper for civil service personnel in New York City, calls attention to a recent test for promotion to the rank of chief of the fire department. Forty-one of the 70 officers eligible to take the exam entered the competition.

Mr. Daly's article points out that the examination did not contain one question about extinguishing a fire. Test questions principally covered administration, planning, inspection, fire prevention, public relations, sick leave policy, elimination of unnecessary forms, relations between management and personnel, command training conferences, the New York City Administrative Code, the 40-hour work week, tightening of discipline, and other subjects. Altogether, there were 24 questions and 26 auxiliary questions. The passing mark was 70 percent and the test was conducted in three sessions of 3½ hours each.

The fact that fire extinguishment was not included as a test subject shows that an important change is developing in the methods of evaluating chief officers who command large fire departments. It indicates an appreciation of the numerous heavy responsibilities of administration and command which fall on the chief's shoulders. By the time he is ready to assume command of the department, he probably has demonstrated for many years that he is proficient in directing the effective extinguishment of fires. Since the knowledge and techniques of this particular aspect of fire department functions are probably imbedded in his memory permanently, it seems extraneous to ask him to take a test on this subject.

It is universally appreciated by the fire service that commanding fire departments of good-sized municipalities calls for modern skillful techniques of business administration as well as the traditional discipline of the fire service. Although they may have mastered fire fighting tactics, many chiefs have a great deal to learn in the new methods of administration, planning, public relations, and human relations, which are already an intrinsic part of large-city fire department functions. Perhaps the elimination of fundamental questions on fire extinguishment in the New York City test will also open a new era of education and experience for those who aspire to the rank of Chief of Department.

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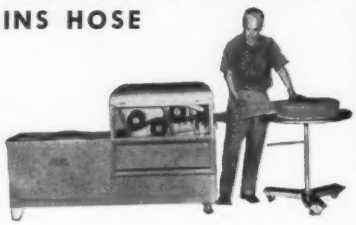

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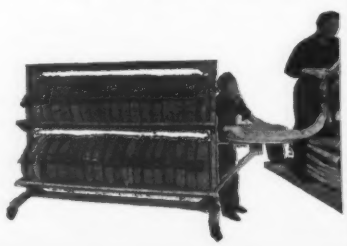

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IRFAA Convention

The 10th Annual Convention of the International Rescue and First Aid Association will be held in Albany, New York October 31–November 2. Headquarters will be at the Sheraton-Ten Eyck Hotel with the New York State Volunteer Ambulance and First Aid Association serving as host. Full information can be obtained by writing to the IRFAA Executive Office, 101 North Alfred Street, Alexandria, Virginia.

Changing address?
Be sure to notify
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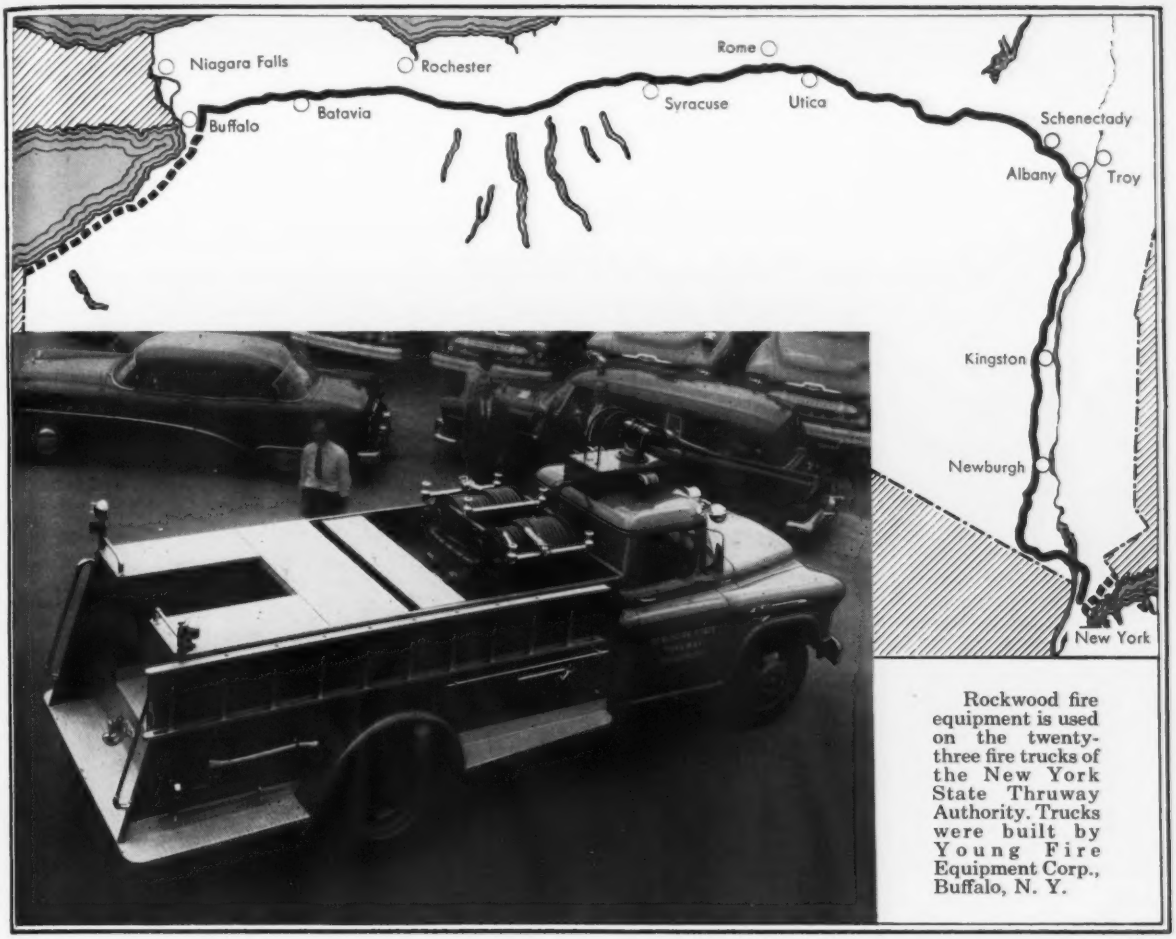

Rockwood fire equipment is used on the twenty-three fire trucks of the New York State Thruway Authority. Trucks were built by Young Fire Equipment Corp., Buffalo, N. Y.

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20 pages, illustrated, 8½ by 11 in.

$1.00 per copy

Specifications for Motor Fire Apparatus

Contains recommendations of the NFPA-IAFC Committee on Fire Department Equipment. Particularly useful for chiefs who are about to purchase a new pumper, tanker or aerial ladder, since it has specific recommendations on pumping capabilities, tank capacities and equipment necessary to meet the severe requirements of fireground service.

60 pages, illustrated, 4¾ by 7¼ in.

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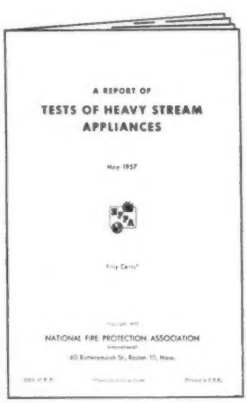

Tests of Heavy Stream Appliances

A report of tests conducted by a subcommittee of the NFPA Committee on Fire Department Equipment. It shows what flows and pressure losses resulted when modern heavy stream appliances of various sizes and capacities were tested, including portable turrets and ladder pipes.

20 pages, illustrated, 4¾ by 7¼ in.

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IAFC Convention Exhibits

CHIEF L. C. Canning, Chairman of IAFC Committee on Exhibits at the 84th Annual Convention in New Orleans, La., September 8 to 12, reports these seventy-three exhibitors signed for space in the Municipal Auditorium:

Akron Brass Mfg. Company, Inc.
American City Magazine
American District Telegraph Co. (ADT)
American Fire Apparatus Company
American Fire Pump Company
American LaFrance Corporation
Ardmore Products
Atlas Safety Equipment Company, Inc.

Batrow Laboratories, Inc.
Bi-Lateral Fire Hose Company
Blackhawk Manufacturing Company
V. H. Blackinton & Company, Inc.
Boston Woven Hose & Rubber Company
Boy Scouts of America, Inc.

Chevrolet — Central Office
Chiksan Company
Circul-Air Corporation
Cornelius Company

E. I. du Pont de Nemours & Co., Inc.

E & J Manufacturing Company
Electronic Protection, Inc.
Elkhart Brass Mfg. Company, Inc.
Eureka Fire Hose Co.

Fabric Fire Hose Company
Federal Sign & Signal Corporation
Fire Engineering
Ford Division, Ford Motor Company
Four Wheel Drive Auto Company
Fyr-Fyter Company

Gamewell Company
Goodall Rubber Company
B. F. Goodrich Company

Hale Fire Pump Company
Hall-Scott, Inc.
Clifford B. Hannay & Son, Inc.
Hewitt-Robins, Inc.

Kohler Company

Donald S. Lavigne, Inc.
Lee-Dee Manufacturing Co., Inc.
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Mack Trucks, Inc.
Mars Signal Light Company
Maxim Motor Company
F. N. McIntire Brass Works, Inc.
Memco Aerial Ladder Company
Midwest Oxygen Equipment Company
Mine Safety Appliances Company
Motorola Communications & Electronics, Inc.

National Cylinder Gas Company
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D. W. Onan & Sons, Inc.
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Sireno Company, Inc.
Southern Bell Tel. & Tel. Company
Stephenson Corporation
J. P. Stevens & Company, Inc.
Super Vacuum Manufacturing Company
Superior Coach Corporation

Emanuel Trilling

United States Rubber Company

Ward LaFrance International, Inc.
Ward LaFrance Truck Corporation
Washington Products Company
Waterous Company
Wooster Brass Division

Fire Administration Institute

A SPECIAL educational program designed to assist fire chiefs with their current and future management problems has been initiated by the University of Southern California in cooperation with the Southern California Division of the California Fire Chiefs' Association.

The course, developed at the request of fire chiefs, will cover a number of subjects which may be new to chief officers, such as human relations, personnel administration, organization, supervision, planning and public relations. The Institute will be directed by Chief C. L. Bolz, formerly of the Pasadena, California Fire Department. It will be coordinated by Desmond L. Anderson of the School of Public Administration at the University, with John Gerletti, former General Manager of the International Association of Fire Chiefs, serving as Advisor.

Meetings will be held every Tuesday from 9:30 A.M. to 4:10 P.M. for sixteen consecutive weeks from October 1, 1957, through January 28, 1958. The principal meeting room will be in the Wilcox Building in Los Angeles. The course is open only to chiefs of fire departments and applications must be submitted before September 10, 1957. The fee amounts to $126.00 plus books and supplies. Six units of college credit upon successful completion of the Institute.

GEORGE TATNALL, assistant chief engineer in the Chicago office of the National Board of Fire Underwriters died last month. He was well known to fire departments in midwestern States and to many other members of the fire service. He frequently appeared on programs of the Fire Department Instructors' Conference in Memphis, Tennessee.

He joined the Chicago office of the NBFU in June, 1924, and was made assistant engineer in charge in November, 1940. He also served in the Pacific Coast territory and was assigned to several inspection bureaus. He was a licensed engineer in Illinois and Wisconsin, a member of the American Water Works Association, the Lions Club of Itasca, Illinois, and the Civil Defense Committee.

Fifty Years of Service

Fire Chief Owen A. Sifritt of Marion, Ohio, recently was cited for his fifty years of service in the department. He was presented with a life membership in the International Association of Fire Fighters. Shown here are (l. to r.) John J. O'Doherty of Lorain, Ohio, trustee of the IAAF; Chief Sifritt; James Bradshaw, President of Local 379 of IAFF; and Rex Kilbourne, Chairman of Fire Prevention Committee, Marion Chamber of Commerce.

Does every man in your fire department subscribe to FIREMEN magazine? If not, they can obtain yearly subscriptions for only $2 each when the department renews NFPA membership.

CLASS A PUMPERS ranging to 1000 GPM capacities with HIGH PRESSURE FOG . . . .
CRASH TRUCKS . . . TANKERS . . . with famous CHAMPION Pumps of 1-2-3-4 stages

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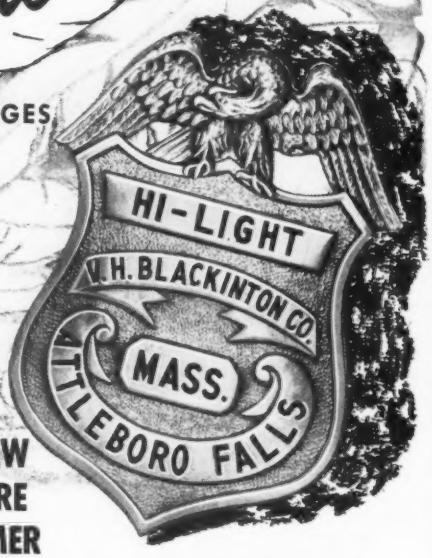
THE NEWEST IN BADGES



SEE THE AMAZING NEW HI-LIGHT BADGE BEFORE YOU ORDER FOR SUMMER

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New President for New England Chiefs

CHIEF Thomas H. Slaman of Wellesley, Mass., was elected president of the New England Fire Chiefs' Association in June. Former Chief John W. O'Hearn of Watertown, Mass., was named secretary-treasurer for the 35th consecutive year.

Directors of the Association include Chief Oliver T. Sanborn, Portland, Me.; Chief Guy L. Foss, Wolfeboro, N. H.; Chief Alfred H. Koltonski, Rutland, Vt.; Chief Bartholomew A. Curran, Scituate, Mass.; Chief Augustus J. Cote, Woonsocket, R. I.; and Chief Francis J. Dagas, East Hartford, Conn.

Chief Drouin Retires

CHIEF Zepherin F. Drouin has retired from the Lewiston, Maine, Fire Department after 34 years of service, including 18 years as Chief of Department.

Born in 1894 he entered the Department December 1, 1923. A year later he was promoted to Lieutenant; in 1929 he became a Captain; then he became a Deputy Chief in 1937, followed by promotion to Chief Engineer in 1939.

He has been a member of the NFPA, the Maine, New England, and International Associations of Fire Chiefs, the Lewiston Municipal Administrative Association, is a past president of the Lewiston Firemen's Relief Association, and past treasurer of the Lewiston Fire Fighters Association, Local 785.

Fire Departments and the Boy Scouts

DURING 1956, a total of 61,656 boys in the United States belonged to the 1,468 Scout units sponsored by paid and volunteer fire departments, reports George K. Myers, National Director, Civic Relationships Service, Boy Scouts of America.

Texas led all other states with a net gain of 19 units, and was followed by Ohio, New Jersey and Pennsylvania. Scouting was featured on the programs of the Fire Department Instructors' Conference, the Eastern Association of Fire Chiefs Conference, and State fire schools in Missouri, Connecticut, Pennsylvania, Virginia, Maryland and Nebraska.

Comments of a Fire Marshal

IOWA'S State Fire Marshal, Edward J. Herron, recently called attention to a weakness in fire reporting which he finds evident in the annual reports of fire departments. Writing in a recent issue of *Fire Service Information*, the bulletin of the Engineering Extension, Iowa State College, Ames, Marshal Herron stated that there was a disturbing amount of "unknown" fires listed for rural losses. He found that 301 of 1,046 reported rural fires were listed with the cause "unknown," and, of 2,991 municipal fires, 428 were listed as starting from an unknown cause.

Marshal Herron also stated:

"About 85 to 90 percent of fires occurring on farms or in homes can be attributed to six or seven major causes, so it would appear that a conscientious effort on the part of the person responsible for checking the fires in his community could determine the cause in most cases.

"I realize that this requires extra work on the part of fire departments or town clerks. The question sometimes arises — 'what difference does it make what caused the fire? The property is destroyed and determining the cause of the destruction will not replace what was destroyed.'

"We think two important facts offset this type of reasoning. The first is that having an accurate accounting of the cause of fires enables authorities to provide safeguards either through laws or ordinances or by redesigning equipment, so that other people will not be victims of recurring fires from common causes.

"The second reason could be that if fires are not caused by carelessness or faulty equipment, the people being victimized by individuals who set fires should be protected so that this type of person is not free to continue his activities."

FOR SALE

Model 45 MACK pumper (1945) with 250 gallon booster rotary gear pump, 2 manual hose reels, 400 gallon booster tank.

See any time at Fire Department Headquarters, Wantagh Fire Department, 3470 Park Avenue, Wantagh, L.I., N. Y.

NO BIDS UNDER $500 CONSIDERED

For additional information, contact

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130 Tardy Lane South, Wantagh, N. Y.
Telephone SUnset 1-3349

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F. R. DIMOND
OF HUTCHINSON, KANSAS

Says: We like
INDIAN
FIRE PUMPS

Because they are carried on the back leaving the men's hands free for climbing ladders, etc. We use them for all Class A fires. They are easy to get off the truck and on to the back of the men using them."

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SLIDING PUMP TYPE

Both types of INDIAN FIRE PUMPS are approved by UNDERWRITERS' LABORATORIES, INC.

SEND FOR NEW CATALOG

No. 80 INDIAN
LEVER TYPE PUMP
and HANDLE

"THERE IS NOTHING ELSE LIKE THEM"

"We have 6 of your **INDIAN FIRE PUMPS** on one of our fire trucks and we have used them 8 years. They are still **just like new.** They are the best things a fire department can have. I have used them for everything, including grass, house, barn, rubbish and many other kinds of fires. We like them very much. **There is nothing else like them.**"

EARL L. KOCH, Assistant Chief, Ann Arbor TWP F.D., Ann Arbor, Mich.

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The modern fire truck is like the Bulldog in *its* operation; on the move or while pumping, it will continue tenaciously, dependably and without rest until its task is completed.

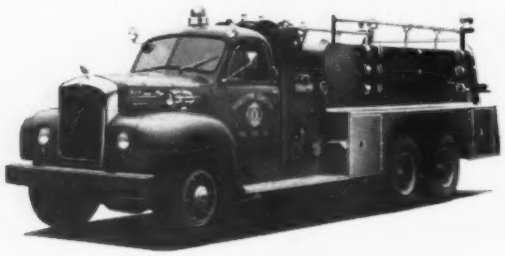
The quality fire apparatus business is highly competitive and no manufacturer will load his trucks with high quality accessories unless they are specified!

Important accessories like the siren and warning light are vital in getting a truck and the men who ride it to the scene of an emergency quickly and safely. Don't accept *any* substitutions, *nothing but the best is good enough!*

And be sure to SPECIFY top quality FEDERAL Warning Equipment like the Class Q Siren and the Beacon Ray light for your apparatus.

Write for literature on FEDERAL Sirens and Beacon Ray lights.

Here is a modern fire truck without frills; a concentration of quality and dependability built by Mack Trucks Inc. Known as type B-505 rated at 500 gpm cap. and equipped with 200 hp engine, 1500 gal. booster, 2 top mounted booster reels and of course, protected with a FEDERAL Model 17 Beacon Ray light and a large FEDERAL lighted siren.



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The CAIRNS "LIFE-GUARD" LINE also includes other leather helmets, in other styles and weights — as well as helmets in aluminum and FLINT-FLEX plastic in regulation and drop-brim styles. Write for Catalog 350.

CAIRNS & BRO., INC. - Allwood, Clifton, N. J.

Fire School Dates

Arizona: The 5th Annual Arizona State Fire Training School will be held at Phoenix, October 17–19. Write to Battalion Chief Jake Siken, Firefighting Instruction Supervisor, 49 South First Street, Phoenix, Arizona.

Idaho: The Idaho State Fire School will be held in Idaho Falls, August 15–17. Write to Chief Bert O. Brown, Fire Department, Idaho Falls, Idaho.

Indiana: The 24th Annual State Fire School will be held at Purdue University, Lafayette, September 10–13. Write to Professor Shelby Gallien, Director Public Safety Institute, Purdue University, West Lafayette, Indiana.

Kansas: The 28th Annual State Fire School will be held at the University of Kansas, Lawrence, in October. Write to Director Clyde A. Babb, 111 Fraser Hall, University of Kansas, Lawrence, Kansas.

Maryland: The 24th Annual Short Course for Firemen will be held at the University of Maryland, College Park, September 3–6. Write to Director Robert C. Byrus, Fire Service Extension, Box 85, College Park, Maryland.

Michigan: The Eighth Michigan Fire Inspectors' Conference will be held at Kellogg Center on the Campus of Michigan State University, East Lansing, September 24–27. For information write to Phillip K. Alber, Secretary and Treasurer, Michigan Fire Inspectors' Society, Michigan State University, East Lansing.

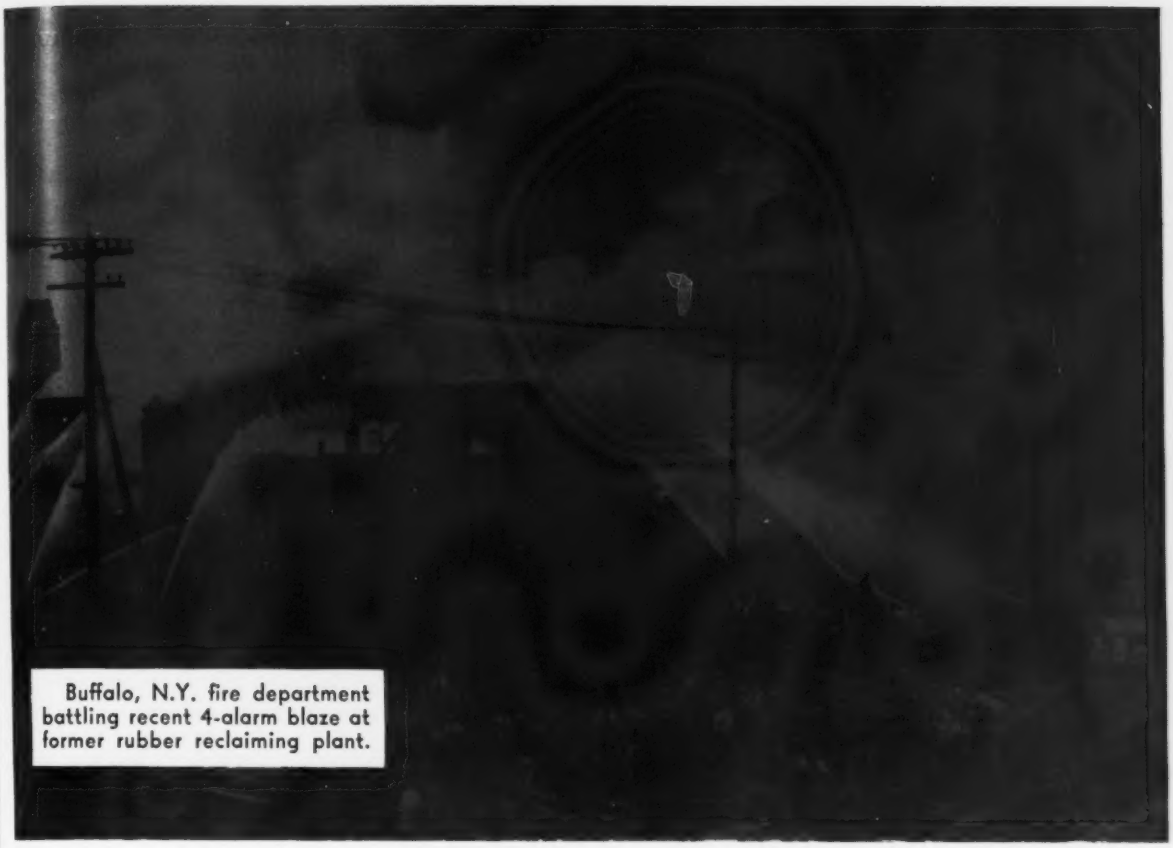
Montana: The 18th Annual State Firemen's School will be held at Polson, August 21–24. Write to Director Clayton Brown, Fire Chief, Polson, Montana.

New Mexico: The Fire Marshals' Fire Protection Conference will be held at Roswell, August 21–23 and Las Vegas, August 25–27. Write to Director John B. Woodall, Deputy Fire Marshal, P.O. Box 311, Santa Fe, New Mexico.

Ohio: The 11th Annual State Fire School will be held at the Ohio State University Campus, Columbus, September 9–13. Write to Co-Director Wayne C. Jenkins, Chief of Fire Prevention, State Fire Marshal's Office, Wyandotte Building, Columbus, Ohio.

Tennessee: The State Fire Service School at Middle Tennessee State College, Murfreesboro, August 19–23. Write to Director Homer S. Elkins, Firemanship Instructor, Trade and Industrial Division, State Board for Vocational Education, 215 Chestnut Street, Chattanooga, Tennessee.

Virginia: State Fire School, Number 9 Fire Station, Thole Street, Norfolk, September 9–13. Write to Director R. Lawrence Oliver, Supervisor-Instructor Fire Service Training, P.O. Box 654, Harrisonburg, Virginia.



Buffalo, N.Y. fire department battling recent 4-alarm blaze at former rubber reclaiming plant.

Photo by: R. L. Delaney, Buffalo Courier-Express

The toughest test of all . . .

No test can possibly duplicate actual fire-fighting conditions. Here, at the scene of a fire, is where your equipment faces its toughest test—a test Ward LaFrance apparatus has passed time after time. For over 39 years, these dependable pumpers have proved themselves in service, operating under the most severe conditions when demands on equipment are greatest. Today's new Ward LaFrance Pumpers —with their specially designed cabs and chassis with unusual safety features—uphold this great fire-fighting tradition. Get full details on 1957 Ward LaFrance models — write and request a representative to call on you.

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FOR FIGHTING FOREST FIRES
FZZ · · · · FZ · · · · HPZF

These 3 HALE Centrifugal Portable Pumping Units can give you the range of volumes and the pressure you need for a wide variety of fires.

All three "Workhorse" units are conveniently portable by two men; can be easily mounted or carried on any type of apparatus or truck for fighting fires while in motion from booster tank; often used to pump from inaccessible water source into major pumper, or to fight fires direct through long lines of hose.

	U. S. Gallons Per Minute	Disch. Press. Lbs. Per Sq. In.
*FZZ	60	90
	100	70
FZ	50	60
	300	10
HPZF	15	200
(Pictured at top)	45	100

*FZZ now has NEW ● Ball-Type Discharge Valve ● Improved Priming

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Fire Department Manpower, Pay Increase

ACCORDING to the 1957 *Municipal Year Book*, recently published by the International City Managers' Association, cities are hiring more firemen and policemen and paying them greater salaries. Tabulations in the book indicate that newly-hired firemen on the average are paid $40 to $261 per year more than recruits were in 1956, depending on the city's size.

Maximum salaries average $5,220 for firemen in cities of more than 500,000 population, tapering down to $3,960 for firemen in cities of 10,000 to 25,000. The average city in 1956 had 1.40 firemen per 1,000 population compared to 1.35 in 1955.

●

New Members in NFPA

Alaska: Fairbanks Fire Department, Fairbanks.

Arkansas: Marvell Fire Department, Marvell.

California: Liberty Rural Fire Protection District, Acampo; Bell Fire Department, Bell; Laguna Beach Fire Department, Laguna Beach; Chief Lester Pallas, Millbrae Fire Department, Millbrae; Montebello Fire Department, Montebello; Chief George J. Koch, Placentia Fire Department, Placentia; Woodside Fire Protection District, Woodside.

Connecticut: Annex Fire Department, New Haven.

Illinois: Monroe Township Fire Protection, Monroe Center.

Indiana: Frankfort Fire Department, Frankfort.

Iowa: Chief Phillip Williamaen, Sibley Fire Department, Sibley.

Montana: Cut Bank Volunteer Fire Department, Cut Bank.

Nevada: North Las Vegas Fire Department, North Las Vegas.

New Jersey: Glen Ridge Fire Department, Glen Ridge; Secaucus Hose Company No. 2, Secaucus.

New York: Brewster Fire Department, Brewster; Brookhaven Fire Department, Brookhaven; Fishkill Fire Department, Fishkill; Gainesville Fire Company, Gainesville; Marlboro Hose Company No. 1, Marlboro; New Hartford Fire Department, New Hartford; Niagara Active Hose Company, Inc., Niagara; Niskayuna Fire Company, Schenectady; West Walworth Volunteer Fire Department, Inc., Walworth; Maplewood Volunteer Fire Department, Inc., Watervliet.

Pennsylvania: New Kensington Volunteer Fire Department, New Kensington.

Volunteers Protect Boy Scouts

VALLEY FORGE, Pennsylvania, scene of the 1957 Boy Scout Jamboree for the duration of the event, commanded national attention July 9–21. The 52,000 Boy Scouts attending from every State and the thousands of daily visitors naturally were a cause of concern to Jamboree directors, simply because of the potential fire and life safety hazards.

To establish adequate fire protection for this two-week event, a four-man committee was formed headed by Fire Chief E. A. Robb of the Philadelphia Plant, E. I. du Pont de Nemours & Co. Chief Robb is also Past President of the Keystone State Fire Chiefs Association and had directed the fire protection work of the previous Jamboree in 1950. Other members of his committee were the following fire marshals: James. Dunn, Chester County; Frank Dolan, Delaware County; and Wilson Green, Montgomery County. Fire department operations for the Jamboree were coordinated under direct supervision of Fire Marshal Dunn.

Approximately 116 volunteer fire departments and about 1,000 fire fighters from Montgomery, Chester and Delaware Counties worked out an intricate schedule to give the Jamboree adequate and continuous fire protection and at the same time "cover" their own communities. They manned three Fire Stations under the supervision of the County fire marshals.

All fire trucks were equipped with booster tanks, and oil and transportation companies loaned a 4500 and a 5500 gallon tank wagon for water supply. Communications throughout the Jamboree area were accomplished with two-way radios supplied by the Pennsylvania State Police.

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The New SCOTTORAMIC Mask gives unlimited vision in all directions, making a rescue job with a Scott Air-Pak safer and surer.

Is your fire company Scott equipped for modern rescue work? Let us show you how little it costs. You'll be amazed at the annual savings over other types of breathing equipment. Write us today or contact your nearest Scott Distributor.

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A small, highly efficient and inexpensive fire fighting deluge gun for permanent mounting. One man can easily direct the streams of three of these guns at one time, locking them into position at will.

The Model 10 Gun is excellent for use on standpipe locations in lumberyards, oil refineries, factories, or any location which has a localized fire hazard.

May be rotated at any angle and locked in position at will

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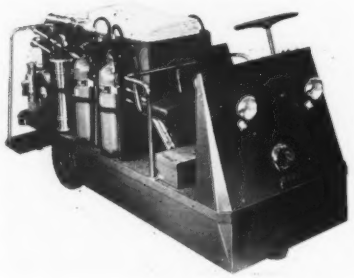

Industrial Fire Truck

This 3-wheel electric-powered industrial fire truck is designed to carry one ton of fire fighting equipment plus five men. Measuring 9 ft. in length, 3½ ft. in width, the 1500 lb. vehicle has a speed up to 10 m.p.h. when fully loaded.

Powered by batteries which feed a special 24-volt direct-drive motor, the vehicle is reported to make 90-degree turns easily in aisles as narrow as 7 ft. Automatic lights and siren go on the moment the stand-up driver steps on the safety treadle. When he leaves his position, the brake sets and power is cut off automatically.

In addition to the driver, the truck can carry three or four men, several hundred feet of hose, three nozzles, six to eight extinguishers, asbestos gloves, helmets and other fire fighting equipment.

Called the "Dyna-Powered Fire Truck" it is being produced by the Electri-Car Division of Victor Adding Machine Company, 3900 N. Rockwell Street, Chicago 18, Illinois. Price is reported to range between $2,200 and $3,200 depending upon modifications and mechanical requirements. Fire fighting equipment is not included in these prices.

Hydrant Pump

The hydrant pump, shown at right, made by Akron Brass Manufacturing Company, Inc., Wooster, Ohio, is rated at 11 gallons per 100 strokes. Made of non-corrosive material, it weighs only 10½ pounds, including an 8-ft. plastic ½-in. hose. It has a universal base which attaches to any square or pentagonal hydrant nut. The pump is a positive displacement, double action, piston-type. The entire unit is priced at $71.50 and may be obtained from the manufacturer at the above address. Ask for Style No. 525B "Hy-Drain" Hydrant Pump.

New Catalog on Extinguishers

The Fyr-Fyter Division of Fyr-Fyter Company, 221 Crane Street, Dayton, Ohio, is now distributing a new catalog on fire extinguishers. The 40-page, illustrated guide lists all types of extinguishers and engines manufactured by the firm. Information is also included for interior fire protection accessories, hose, breathing apparatus, brass valves and nozzles. Copies may be obtained free by writing to the Customer Service Department, The Fyr-Fyter Company, at the above address.

"Blue Book" on Generating Plants

D. W. Onan & Sons Inc. of Minneapolis, Minnesota, has revised its "Blue Book" of general information concerning the selection of engine driven electric generating plants. The new 32-page, 4- by 8-in. illustrated pocket-size booklet traces the history of electric plant development and reviews the three types of prime mover which furnish the mechanical power for driving the generator: that is gasoline, Diesel, and gas engines. Copies of the "Blue Book" are available free by writing to the manufacturer at the above address.

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"Hold That Line — With DIRT," popular 10-minute, 16 mm. color film with sound, has been approved for purchase under the FCDA matching funds program and is now in use by state foresters, Civil Defense and the United States Forest Service. Write to Fire-Fighting Films, 414 Mason Street, San Francisco 2, California.

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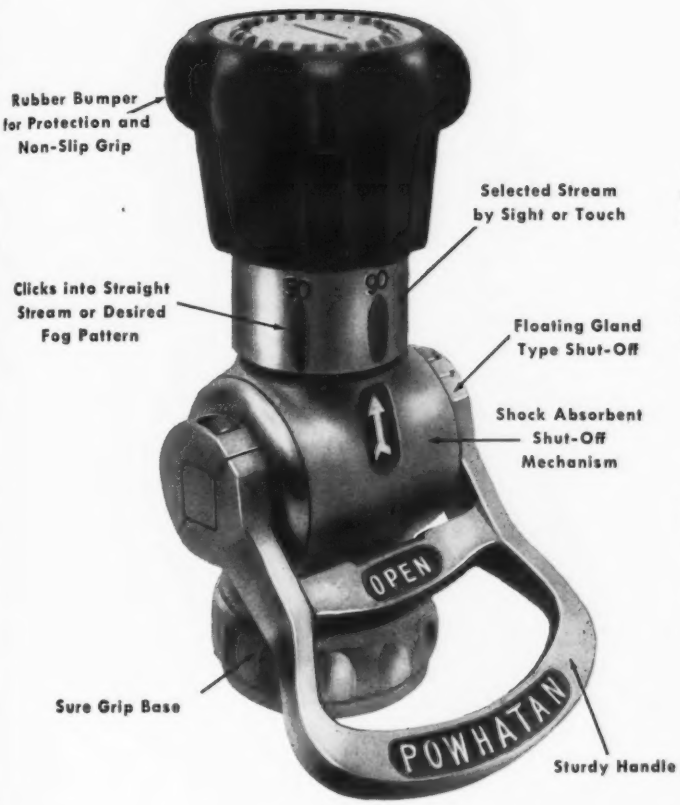
NEW DURA-FOG NOZZLE by POWHATAN

NAMED FOR ITS DURABILITY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Clicks into Straight Stream or Desired Fog Pattern
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100% PERFORMANCE TEST for every Dura-Fog Nozzle!

Performance Test Data for 1½" Size

Water Pattern	GPM	Reach	Nozzle Pressure
STRAIGHT STREAM	57 62	85' 105'	100 psi 125 psi
30° FOG PATTERN	60 65	40' 43'	100 psi 125 psi
60° FOG PATTERN	65 68	30' 35'	100 psi 125 psi
90° FOG PATTERN	72 75	20' 22'	100 psi 125 psi

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Whether your premises are new or old, sprinklered or unsprinklered, there is an ADT Automatic Protection Service to detect dangerous conditions and to notify fire, police or other protective forces immediately and *automatically*.

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